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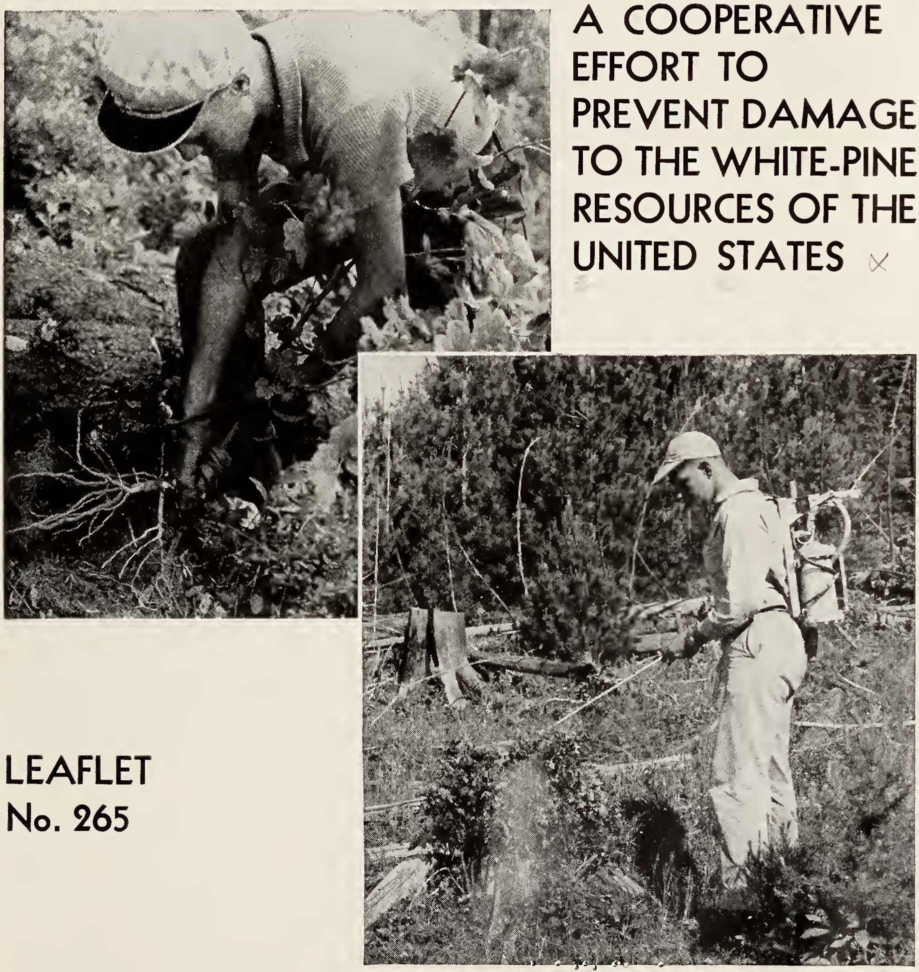
UNITED STATES



LEAFLET
No. 265

U. S. DEPARTMENT OF AGRICULTURE

CONTROL OF WHITE-PINE BLISTER RUST

A Cooperative Effort to Prevent Damage to the White-Pine Resources of the United States

Prepared by the Division of Plant Disease Control, *Bureau of Entomology and Plant Quarantine, Agricultural Research Administration*

White, or five-leafed, pines of the United States have contributed a full share to the development of this country. They are valued especially because of their rapid growth, high quality, and the workability of their wood. White pines in association with other trees protect watersheds, wildlife, and forest soils. They add beauty to the landscape and provide an attractive setting for recreation and rest.

The three most important kinds of white pine in the United States are the eastern white pine, western white pine, and sugar pine. Their combined timber-producing, protective, and scenic values represent a local, regional, and national resource of great importance. Because of their industrial and social values they must be guarded against the destructive forces of fire, insects, and disease so that they may continue their usefulness through growth and regeneration.

AN ALIEN ENEMY

Blister rust, a destructive disease of white pine, is an alien enemy. It was introduced into this country in nursery stock imported from Europe. The disease spread from the centers of introduction and soon became a threat to the white pine forests of North America.

The disease is caused by a fungus which lives on white pines and on wild and cultivated currant and gooseberry bushes, called ribes. The fungus spreads by means of tiny wind-borne spores. The disease cannot be transmitted directly from one pine tree to another. The fungus lives over the winter on infected pine trees. In the spring, spores spread from diseased pines to nearby ribes. The spores that infect pines are produced on these plants. Where there are no ribes, blister rust cannot infect white pines.

The disease was not discovered in North America until 1906, although it probably reached the eastern United States about 1898. By 1915 it had become firmly established in the white pine forests of the Northeastern States. In 1921 the rust was found in western North America at Vancouver, British Columbia. It was introduced there in 1910 in nursery stock from France. Following these accidental introductions, the disease spread naturally until it is now present in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Con-

Western white pine, the backbone of the northern Rocky Mountain lumber industry.

necticut, New York, New Jersey, and Pennsylvania in the northeastern part of the country; in Delaware, Maryland, Virginia, West Virginia, North Carolina, and Tennessee in the Appalachians; in Iowa, Illinois, Indiana, Ohio, Michigan, Wisconsin, and Minnesota in the North Central region; in Montana, Idaho, and Wyoming in the Rocky Mountain States; and in Washington, Oregon, and California on the Pacific coast.

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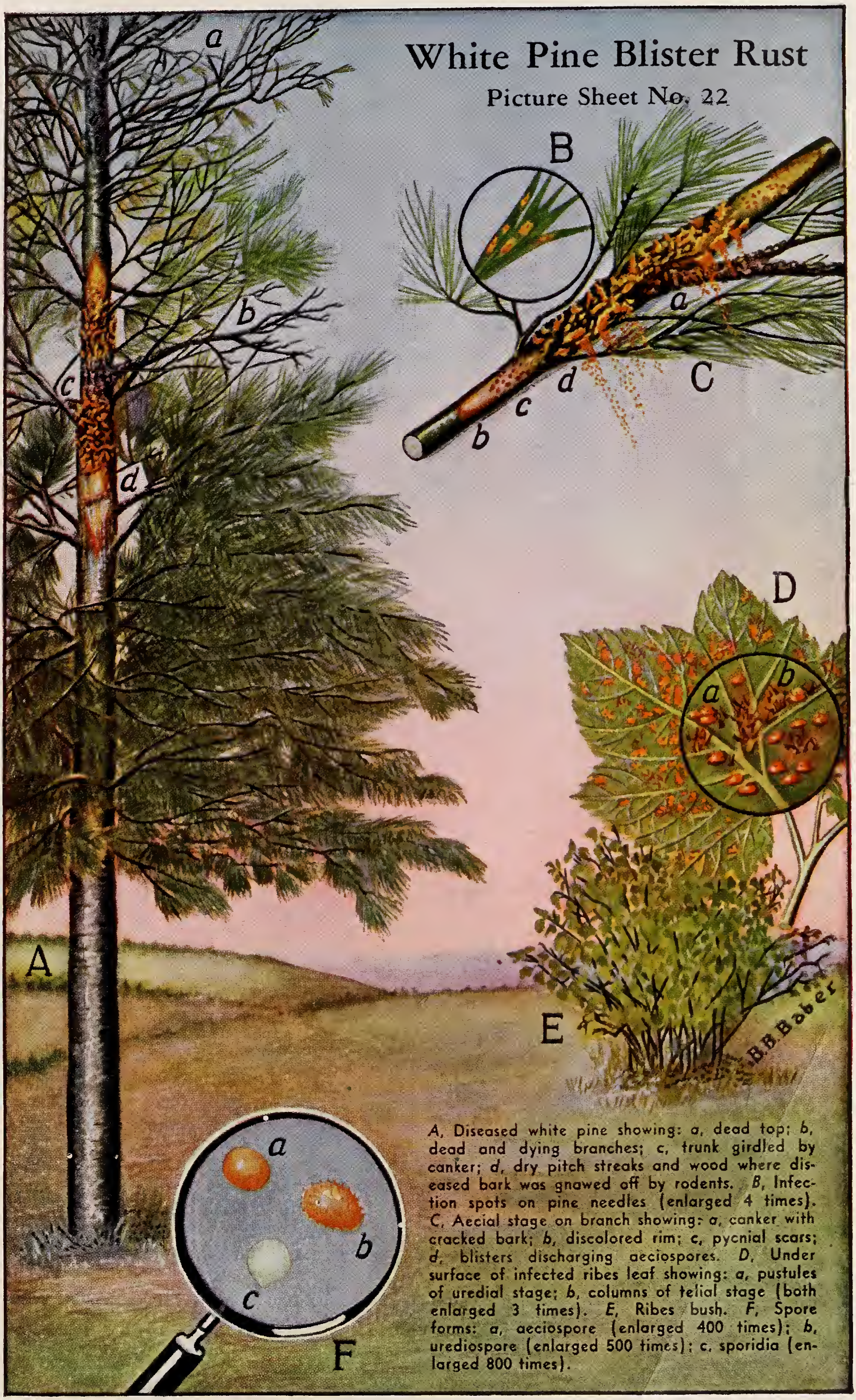
From Maine to Minnesota and south to Georgia eastern white pine is the number-one lumber-producing tree.

White Pine Blister Rust

Picture Sheet No. 22

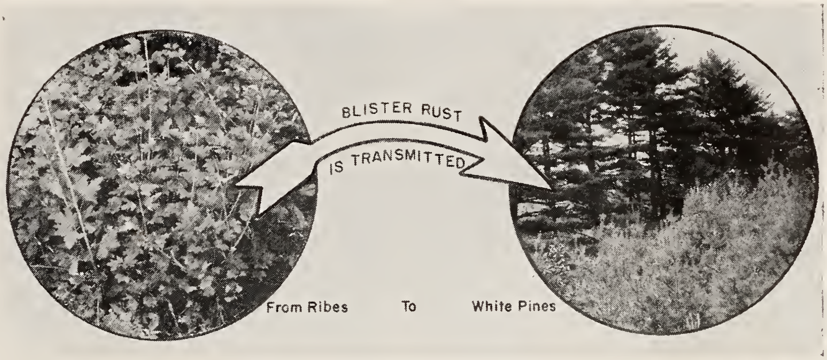


A, Diseased white pine showing: *a,* dead top; *b,* dead and dying branches; *c,* trunk girdled by canker; *d,* dry pitch streaks and wood where diseased bark was gnawed off by rodents. *B,* Infection spots on pine needles (enlarged 4 times). *C,* Aecial stage on branch showing: *a,* canker with cracked bark; *b,* discolored rim; *c,* pycnial scars; *d,* blisters discharging aeciospores. *D,* Under surface of infected ribes leaf showing: *a,* pustules of uredial stage; *b,* columns of telial stage (both enlarged 3 times). *E,* Ribes bush. *F,* Spore forms: *a,* aeciospore (enlarged 400 times); *b,* urediospore (enlarged 500 times); c, sporidia (enlarged 800 times).

Sugar pine, the producer of top-value lumber in California and Oregon.

CANKER KILLS WHITE PINE

Blister rust kills white pines of any size or age. Young pines are killed within a few years. Their loss interferes with the natural renewal of future crops of these valuable trees. Serious damage to



older trees results in their death before they reach maturity. This materially reduces the value of the forest crop unless the diseased trees can be harvested before they are killed by the rust.

Attack by the disease is followed by the development of cankers in the bark. Infected pines die when a canker completely girdles the main stem or trunk or when many of the branches are killed by girdling.

CONTROL SHOWS PROGRESS

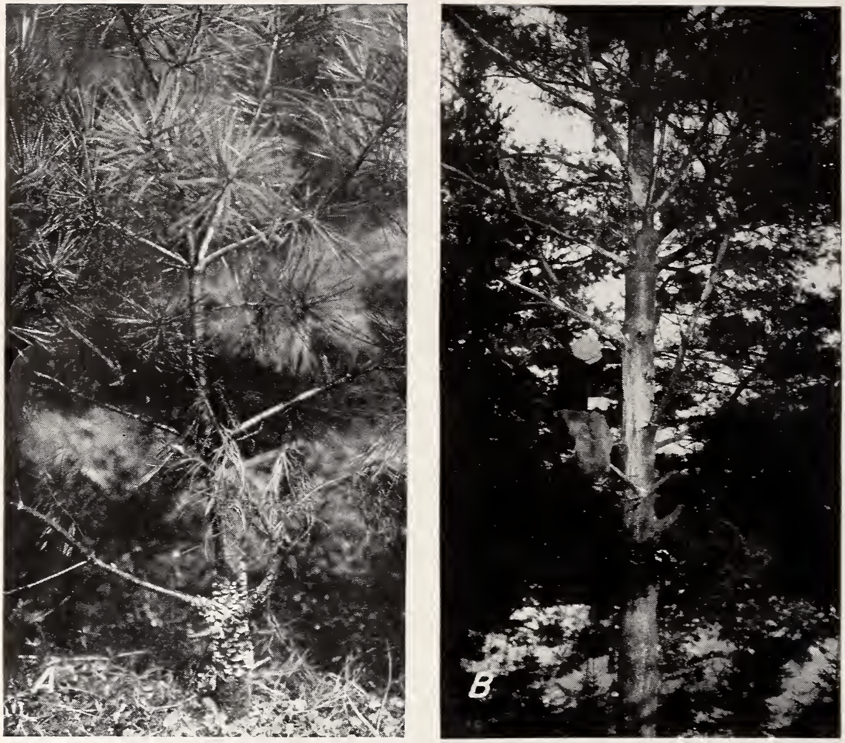
Loss of white pines from blister rust can be prevented by destroying the wild and cultivated ribes bushes growing within infecting distance of the trees and by preventing the establishment of new bushes. The infecting distance seldom exceeds a few hundred feet.

Ribes bushes are removed from pine areas by trained workers who systematically locate and destroy the bushes on hundreds of thousands of acres annually. They are generally uprooted by hand or dug with a tool. In some situations it is best to kill them with chemical sprays. In others, dry chemical mixtures or concentrated liquids are applied to the stubs after the tops have been cut off flush with the ground.

One thorough working of an area gives protection for a few years. However, some small bushes may be overlooked, seeds in the soil may germinate and produce new plants, and sprouts may develop from bushes incompletely destroyed. Any of these conditions may result in restocking an area with ribes, which in time can become a new menace to the pines. This can be prevented by reworking treated areas and destroying the ribes on those portions where they have become reestablished.

The United States Department of Agriculture is carrying on a carefully coordinated and supervised program to establish and maintain control of the rust in the several sections of the country producing white pine. This program is succeeding because of the cooperation of forest owners, counties, townships, communities, associations of timberland owners, and Federal and State land-managing agencies. The disease has been controlled effectively in areas where removal of ribes has been thorough.

Forest owners can aid in getting rid of ribes by managing their white pine woodlands in accordance with approved forestry methods. Well-stocked stands provide shade, which helps suppress ribes. Logging



Trunk canker: *A,* Young pines are killed in a few years; *B,* in older pines the killing process is slower.

practices that disturb the soil excessively and admit full sunlight into the forest should be avoided wherever practicable, as this combination of conditions favors the regrowth of ribes.

Systematic work to control blister rust is required on about 27,000,000 acres in 27 States to meet present national needs for white pine products. By the end of 1948 over a billion and a half ribes bushes had been destroyed. The disease is under control on more than 12,000,000 acres, under partial control on about 11,000,000, and uncontrolled on 4,000,000. Much remains to be done, but with continued cooperation and sustained effort success will be realized in guarding the important white pine resources of the Nation from this destructive disease.

Owners of white pine forests should consult the official in charge of blister rust control in their locality or their State departments of forestry, conservation, or agriculture concerning the control measures to protect their trees from white-pine blister rust.

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